

## EE 204 Home Work # 7 Solution

### 6.1-1

$$(b) \quad 2 \sin(3t + 45^\circ) = 2 \sin(3t - 45^\circ + 90^\circ) = 2 \cos(3t - 45^\circ)$$

$$\boxed{\theta = -45^\circ}$$

$$(f) \quad 2 \sin(t - 215^\circ) = 2 \sin(t - 305^\circ + 90^\circ) = 2 \cos(t - 305^\circ)$$

$$= 2 \cos(t + 55^\circ)$$

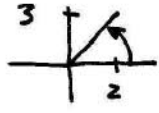
$$\boxed{\theta = 55^\circ}$$

### 6.1-2

$$(a) \quad 2 \cos(3t) - 3 \sin(3t) = M \cos(3t + \theta)$$

$$\boxed{M = \sqrt{13}} \quad \boxed{\theta = 56.31^\circ} \quad \tan \theta = \frac{3}{2}$$

$$= M \cos \theta \cos(3t) - M \sin \theta \sin(3t)$$

$$= M \sin(2t + \theta)$$


$$(f) \quad -2 \sin(t - 30^\circ) = A \cos(t) + B \sin(t)$$

$$\boxed{A = -2 \sin(-30^\circ)} \quad \boxed{B = -2 \cos(-30^\circ)}$$

$$\boxed{= 1.0} \quad \boxed{= -1.73}$$

$$(g) \quad -4 \cos(t + 135^\circ) = A \cos(t) + B \sin(t)$$

$$\boxed{A = -4 \cos(135^\circ)} \quad \boxed{B = 4 \sin(135^\circ)}$$

$$\boxed{= 2.83} \quad \boxed{= 2.83}$$

### 6.2-1

$$(d) \quad \hat{A} + \hat{B} = \boxed{5 - j7}$$

$$= \boxed{8.6 \angle -54.46^\circ}$$

$$\frac{\hat{A}}{\hat{B}} = \boxed{-0.47 + j0.05}$$

$$= \boxed{0.47 \angle 173.45^\circ}$$

$$\hat{A} \hat{B} = \boxed{74 + j98}$$

$$= \boxed{122.8 \angle 52.94^\circ}$$

## 6.2-1

$$(f) \hat{A} + \hat{B} = \boxed{-14 + j1} = \boxed{14.04 \angle 175.91^\circ}$$

$$\hat{A} = \boxed{1.9 + j1.2}$$

$$\hat{B} = \boxed{2.25 \angle -327.72^\circ}$$

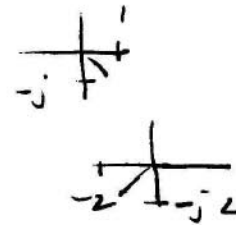
## 6.2-5

$$(b) \hat{A} = (1-j1)(2 \angle -135^\circ) + \frac{-2-j2}{2 \angle -45^\circ}$$

$$= \sqrt{2} \angle -45^\circ \cdot 2 \angle -135^\circ + \frac{2\sqrt{2} \angle -135^\circ}{2\sqrt{-45}}$$

$$= 2\sqrt{2} \angle -180^\circ + \sqrt{2} \angle -90^\circ$$

$$= \boxed{-2\sqrt{2} - j\sqrt{2}}$$



$$(d) \hat{A} = \frac{-3+j3}{2 \angle 45^\circ} - \frac{(2-j2)(1 \angle -90^\circ)}{-2j} = \frac{3\sqrt{2} \angle 135^\circ}{2 \angle 45^\circ} - \frac{2\sqrt{2} \angle -45^\circ (-j)}{2 \angle 90^\circ}$$

$$= \frac{3}{2} \sqrt{2} \angle 90^\circ - \sqrt{2} \angle -45^\circ$$

$$= j \frac{3}{2} \sqrt{2} - (1-j1)$$

$$= \boxed{-1 + j3.12}$$

